

REMARKS

This is in response to the Office Action mailed on July 16, 2007 in which claims 1-8 and 17-26 were rejected.

Claim Rejections Under U.S.C. § 112

Of the rejected claims, claims 1-8 and 19 were rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement because of inclusion of the term “ultrafine”. Claims 1-8 and 19 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term “ultrafine” in claims 1, 3, and 19 was considered a relative term which rendered the claims indefinite.

With this Amendment, the term “ultrafine” has been removed from the claims. Claim 1 is amended to require (b) filling said cavity with microcircuit dimensions with a ceramic slurry of about 70% to about 90% by weight of particles having sizes of about 0.1 to 50 microns. Claim 3 is amended to require (a) from about 70% to about 90% by weight of ceramic particles having sizes of about 0.1 to about 50 microns. Independent claim 17 is amended to require from about 70% to about 90% ceramic by weight particles having sizes of about 0.1 to about 50 microns. Dependent claim 19 is amended to require from about 70% to 90% ceramic particles having sizes of about 0.1 to about 50 microns.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, and 4-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Weaver (U.S. Patent No. 4,341,725) in view of Whalen (U.S. Patent No. 5,824,250) and Auxier (U.S. Patent No. 6,247,896); and claim 3 was rejected over Weaver, in view of Whalen, Auxier, and further in view of Downing (U.S. Patent No. 3,885,005).

The Weaver patent teaches slip casting and freeze drying to produce molds and ceramic castings with ordinary dimensioned features. Examples I and II in the Weaver patent, teach the casting of simple refractory tubes with a slurry containing over 40% by weight of refractory particles greater than 100 micron grit size (col. 5, line 7 “silicon carbide (100F)”). Claims 1, 2, and 4-8 as amended refer to cavities filled

with a slurry including about 70% to about 90% particles having sizes of about 0.1 to about 50 microns. Microcircuit dimensions as taught by Auxier U.S. Patent No. 6,247,896 and included in the specification by reference, feature channels with square and rectangular cross-sections 0.010 inches (254 microns) on a side. In order to mold right angle features at the corners of 254 micron wide channels (i.e. microcircuit dimensions), powders containing a substantial amount of particles less than 10 microns in size are required. It is known in the art that powders with a particle size distribution ranging from 0.1 micron to 50 micron are commonly prepared by ball milling followed by sieving with a 50 micron sieve to limit the maximum particle size to 50 microns. Particle size distributions in most powders prepared in this manner have a Gaussian-like size distribution containing large fractions with sizes distributed about an average size between 0.1 and 50 microns. A broad particle size distribution is required for successful densification during firing. The fines fill the interstices between the larger particles in the green unfired body and aid in densification. The powder with a particle size distribution ranging from 0.1 microns to 50 microns will be suitable for producing castings with microcircuit dimensions. The examples noted above in the Weaver patent could not be used to produce the parts referred to in the present specification. Weaver (col. 2, lines 9-10) teaches from Downing et al. a casting slip prepared from relatively coarse (70% coarser than 200 mesh) powder. Furthermore, Downing claim 1 teaches a method to produce a refractory body in which at least 70% of the particles in said composition are of size greater than 200 mesh and up to $\frac{1}{2}$ inch. These two slips could not be used to perform the method of the present invention and could not form ceramic articles having microcircuit dimensions.

Claims 17, 18, and 20-26 were rejected under 35 U.S.C. § 103(a) over Weaver in view of Whalen, Auxier and Campion (U.S. Patent No. 6,247,896); and claim 19 was rejected over those references further in view of Downing. Claim 17, as amended, refers to cavities filled with a slurry that comprises from about 70% to about 90% by weight ceramic particles having sizes from about 0.1 to about 50 microns. As discussed earlier, Weaver and Downing do not teach a slurry sufficient to produce castings with microcircuit dimensions. Finally, the Examiner notes that 200 mesh (Downing) corresponds to a

particle size of about 0.003 inches, which is not substantially different from the 0.002 inch (50 micron) particle size of the disclosed invention. In fact, 0.003 inches is 150% larger than 0.002 inches and can be a factor in replicating features with microcircuit dimensions in ceramic molding. Claims 17-26 all depend from claim 1 and are allowable for the same reasons discussed with respect to claim 1.

CONCLUSION

This Amendment places the application in condition for allowance. Notice to that effect is requested.

Respectfully submitted,

KINNEY & LANGE, P.A.

Date:

10/16/07

By:



David R. Fairbairn, Reg. No. 26,047
THE KINNEY & LANGE BUILDING
312 South Third Street
Minneapolis, MN 55415-1002
Telephone: (612) 339-1863
Fax: (612) 339-6580

DRF:BGK:ks